sion at Wolverton. The loss to the company by that one accident will amount, it is understood, to between 20,000*l.* and 30,000*l.*,—a sum which would of itself have paid for a great many additional breaks and breaksmen, besides thus saving a good many lives, which no 'compensation' can either make up for or replace. And in conclusion we would as earnestly call on Mr. D'Israeli, as a legislator, to *suspend* a director forthwith if the public appeal now ringing in their ears shall prove as unavailing as we fear it may; and to that end he need not go far from his seat on the opposition benches of the Commons House of Parliament to find the fitting subject; before whose cool and calculating eye we would, in the meantime, moreover, wish very much to place the following little intimation of means already adopted, by decree, in the certainly somewhat imperious, if not the less really free, dominions of his majesty the Austrian Emperor, for the prevention of injury *to* railways;—an intimation extracted from *Galignani*, and from which it appears, that in Austria they are *beginning* to know a little better how to deal with such subjects than we do. We only wish that the trifling little amendments, which we have taken the liberty of appending in brackets, and which might as well have been inserted in the original, were embodied at least in an Act like the one alluded to, and carried by Mr. D'Israeli *versus* Mr. Hudson.—that is, in spite of him,—through our own House of Commons:—"Any damage done to [or by] railways, to [or by] the machines, means of conveyance, &c., of a nature to endanger the lives, safety, or property of individuals, shall be punished with from one to five years' imprisonment [of all concerned] if no accident occur; and with from five to ten years in the event of any accident. Any act [or omission] causing any such injury is to be punished with the same penalties; and any *employé* [director or other manager] of the *railway causing accidents*, whatever may be their consequences, by his negligence [or neglect of effectual means of prevention], is to be punished with from five to ten years' imprisonment; if the consequences of the accident are very serious, with from ten to twenty years' imprisonment; and if death be caused, with the punishment of death [to his *directorship*,—of course by *suspension*]."

SOCIETY OF ARTS, ADELPHI.

GLASS—STONE.

JUNE 9.—Mr. George Moore, V.P., in the chair. A paper by Mr. Deacon was read, "On the manufacture of the sheet and patent glass, as practised at the St. Helen's Glass Company's, Lancashire." The process consists in blowing out the glass in the ordinary manner into the form of a large glass bottle: it is then brought into a form almost cylindrical, and split and distended by means of heat, and formed into a flat sheet.

A paper by Mr. Teyeheune, "On his process for rendering all soft and porous stone hard and impermeable, and also for varying the colours of the same," was also read. The process employed consists in drying the stones in a heated apartment until all dampness is evaporated: the stone is then cut to the form designed. Coppers are constructed in a manner adapted for being heated by fire or steam, and these contain the composition or stone to be hardened. The composition employed is coal-tar, fine sand, asphaltum, resinous and bituminous substances, and mineral caoutchouc, vegetable resin, gums, oil, iron-filings, carbonate and silicate of lime, granite-stone (in powder), carbonate of lead, coarse clay, ochre, sand, other mineral earths, and salts. This composition is to be boiled with the stones several hours.

A communication was read by A. Angus Croll, on the domestic uses of gas. The author commenced by stating the difficulties which have hitherto stood in the way of gas being introduced and used for domestic purposes, and then proceeded to give a lengthened statement of its cost for lighting rooms, &c., as compared with oil or candles. He also described the new processes for purifying the gas as employed by the various Gas Companies in and about London, and concluded by exhibiting several models of his new dry gas meter, which he said is also being used as a surgical instrument for ascertaining the state of the lungs.

WESTMINSTER COURT OF SEWERS.

A COURT was held on the 15th ult. at the Sewers' Office, Greek-street; Alderman John Johnson in the chair.

A communication was read from the Railway Commissioners with reference to the rights of the Commissioners of Sewers being preserved in the construction of railways, and that a clause might be introduced in any bill for that purpose.

The question of the hydrostatic valve, for preventing the emission of noxious vapours from the gratings of sewers, the invention of M. Abate, and already described in our pages, was brought before the court, and referred to the surveyor to report thereon. The subject of untrapped drains was also brought before the court, in a communication from the paving-board of St. George's, Hanover-square.

C. Haimsworth, who had been summoned to appear for irregular drainage in Henry-place, Portland-town, was fined 10*l.* unless the orders of the court were complied with within one month.

Mr. Adams, of the Sun Tavern, Curzon-street, May-fair, was summoned for an illegal drainage into the King's Scholars' Pond Sewer. He stated, that the house had partially drained into it for twenty-five years, and called a workman to prove this fact. The matter was adjourned to the next court.

The Public Health of Marylebone.—The court appointed this day for the purpose of receiving tenders for the first portion of the works recommended by the surveyor for effecting the above object, viz., for 2,950 feet of sewer along Berwick-street, St. James's; and Wells-street and Great Titchfield-street, Marylebone. The tenders delivered in were as follow:—

J. Barr	£2,960	0
H. Perkins	2,716	0
Scisson and Co.....	2,430	0
Hill and Co.....	2,368	0
Williams and Co.....	2,340	0
J. Yeoman	2,199	0
Humphreys and Thirst..	2,185	0
J. Walter.....	2,031	19
W. Dethick	1,883	0

Mr. Dethick's tender was accepted.*

INSTITUTION OF CIVIL ENGINEERS.

JUNE 15.—The president in the chair. The paper read was, "On the Law which governs the discharge of Elastic Fluids under pressure, through short Tubes and Orifices." By Mr. William Froude.

The law proposed was a modification of that which has been usually assumed, viz., a simple application of that which holds good with respect to non-elastic fluids. This law is generally, that the velocity of issue is directly as the square root of the density; but this law neglects wholly the reaction that must arise from the expansion necessarily taking place in the course of issue. The nature of the action was illustrated by the following example:—If a balance be supposed, with an equal weight in each scale, one of the weights being a spiral spring, like that of a spring balance, compressed lengthwise with its axis vertical, and held in a state of compression by a cord; now let the cord be suddenly severed, so that the spring is enabled to extend itself vertically,—the scale in which it stands will obviously be depressed, the spring re-acting on it as it expands upwards, and continuing to press till wholly relaxed; or if the scale in which it stands were ascending by a preponderance given to the other scale, the rate of its ascent would be in the same way retarded.

The amount of the retardation would depend on the strength and weight of the spring, and on the length to which it would extend itself when released. Now, in the discharge of an elastic fluid, there is an action strictly analogous, operating continuously, however, instead of *per saltum*, the strength and weight of the spring being represented by the elasticity and density of the fluid, and the length to which it would extend itself by the degree of expansion in the course of issue.

The reduction in quantity of discharge, due to the action, was to be measured by the velocity imparted by expansion to each particle of the elastic fluid in course of issue; the velocity of each particle after expansion would be its velocity before expansion, multiplied into the rate of expansion, and the primary force must be sub-divided in generating each additional unit of velocity, so that the portion applicable to the generation of velocity before expansion, would be the whole force divided by the rate of expansion; thus the velocity before expansion would be divided by the square root of that rate. For instance, an elastic fluid expanding four times in course of issue, would be discharged with only half the velocity of a non-elastic fluid, under the same circumstances of pressure and density. This modification was shewn to fulfil the general dynamical law, "that a given force acting for a given time will produce a given momentum, whatever be the weight of the mass acted upon,"—this seemed to be the essence of the law for non-elastic fluids; but it was disregarded by the unmodified application of that law to elastic fluids, in which there would be a great accession of velocity, of particles issuing under a given pressure, without any reduction of quantity discharged in a given time; if, however, the quantity be reduced as proposed, in the ratio of the square root of the density, and the velocity be accelerated in the same ratio, the final momentum would be the true equivalent of the pressure.

This, in its practical application, explained what was inexplicable by the ordinary theory,—the difficulty experienced from the back pressure of the waste steam in locomotive engines; and a diagram was given, shewing that at sixty miles per hour this would be at the least equivalent to 8 lbs. per inch throughout the strata, thus shewing a loss of nearly fifty horse-power.

After the meeting, Mr. Lambert exhibited his flexible diaphragm water-valve, which was intended to remedy some of the defects of the plug-cock. It avoided the leakage and necessity of repairs.

June 22nd.—The paper read was by Mr. Joseph Glynn, giving "An account of the plans that have been proposed for connecting the Atlantic and Pacific Oceans by a navigable canal."

The author took a review of these projects, from the time of Cortez, who proposed to cross the Isthmus of Tehuantepec by joining the waters of the river Coatzocoalcos, which flows into the gulf of Mexico, with those of the river Chicapa, flowing into the Pacific by the Bay of Tehuantepec; a plan which has lately been revived by Don José de Garay, who with the assistance of Senor Moro, surveyed the country from sea to sea, and shewed that the chain of mountains is there broken for about thirty-five miles, giving place to an elevated plain, or table land, called the Mesa de Tarifa, where both these rivers originate, and where their junction would be easily effected. The objections to the plan are the length of the river navigation, about 200 miles, and the ascent of the stream to the Mesa de Tarifa, about 200 metres, or 656 feet above the ocean.

The Isthmus of Panama presents fewer obstacles than any other points. The whole distance from sea to sea is only about thirty nine miles, and the country is traversed for nearly the whole width by the great river of Chagres and its tributaries, which are interlaced as it were, with the streams flowing to the Pacific. The chain of mountains here sinks into extensive savannahs and forests, with a few detached and isolated hills of small elevation, seldom exceeding 500 feet in height.

The country was surveyed in 1825 at the instance of General Bolivar, by Mr. Lloyd, an English officer, who also took the levels, and determined the difference between the two oceans to be 34 feet (33.2), the waters of the Pacific being the highest.

The maps, plans, sections, and other valuable information deposited with the Royal and Geographical societies, seem to have created but little interest in England: but they have been diligently examined, and extracts and copies taken by foreigners, who have had free access to them, especially by the French; and M. Guizot lately sent M. Napoleon Garella as engineer-in-chief, with a numerous staff of assistants, to make a further survey, and ascertain the practicability of making a canal. This

* In reference to the large balances in hand at the end of last year, alluded to in our last, we were informed that that sum had been reduced on the 16th of June last, by the payment of works in hand, to 71*l.* 13*s.* 6*d.*, which balance had been still further reduced at the present time.

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